Such institutes are too few; for they are not only "light-bringing, but fruit-bearing." They not only form the foundation of scientific and efficient treatment of disease, but are the source whence spring such discoveries as bless the whole world, and crown with the gratitude of nations the names of Jenner, of Simpson, of Pasteur, and of Lister.

One of our kings, sir, zealously helped forward Harvey's immortal work on the movements of the heart and of the blood; another founded the Royal Society, "to search out the secrets of nature by way of experiment."

To you, therefore, as a patron of all that tends to the increase of knowledge and the relief of suffering, we turn and ask your Royal Highness to open this laboratory.

In Harvey's words: *Ad viliorum animalium inspectionem cum Heraclito apud Aristotelem introire si vultis, accedite, nam neque hic Dii desunt immortales.*

The Prince of Wales then declared the building open, and, in the course of a short address, he is reported by the *Times* to have said:—I understand that the building which I have just declared open is to be used in great part for the study of those sciences which have for their object the observation of the natural laws of life. It was in such observations that your distinguished physician, Sir William Gull, first won renown. Nor is it possible to over-estimate the value of such work in the investigation and treatment of disease. One thing I would venture to impress upon our students—namely, that, in endeavouring to follow in the footsteps of the great and good men whom Guy's delights to honour, they should cultivate that gentle and humane spirit which, not confined to any one school, is the best possession of the medical faculty. I have made careful inquiries, and have every reason to believe that whenever experiments upon animals are performed in this school they are undertaken with the object of promoting advances in medicine and surgery which are likely to be of benefit to suffering humanity, and I have satisfied myself that such experiments are conducted under strict supervision, by highly qualified investigators, and that in practice the only operations performed upon animals which are not in a condition of complete anæsthesia are inoculations and hypodermic injections. Looking back upon the history of this school, one cannot but admire the wonderful powers of observation which enabled such men as Astley Cooper, Bright, Addison, Hodgkin, and Gull, with but slender aid from scientific apparatus, to add so largely to the sum of human knowledge. I need hardly remind you that more than one of these great workers in your profession has had his name perpetuated in connection with the discoveries he made in the wards of Guy's Hospital—discoveries which paved the way for the more enlightened treatment of some of the most frequent, and yet most fatal diseases to which man is subject. That harvest has been gathered, and for the present and future generations it remains, with more exact appliances and more delicate apparatus provided by the sister sciences, to seek on other fields to emulate their illustrious predecessors' example. To this end are needed ampler buildings, specially designed rooms, and complicated mechanical contrivances, all of them involving additional expenditure. Your senior physician has made it clear to all how, relying upon themselves, the staff of the medical school have erected this building. I may be permitted to emphasise the fact, to which Dr. Pye-Smith has alluded, that the present building is but an instalment of a more extensive design which is to be completed as soon as funds are forthcoming. I would venture to express a hope that this day may not be long delayed, and that when the building is completed, room will be provided to adequately display the unique collection of wax models which so much interested me when first I visited your museum. The medical staff have expended as much as they safely can, and it is to men of wealth and philanthropic aspirations that we confidently look for further assistance. Let such men once realise that money given for the purposes of medical education directly benefits humanity, and I cannot doubt that that spirit, which has prompted the British people to provide by voluntary effort what in other countries is provided by the State, will prove effective in the present need. On you students of medicine—and a medical man, as Dr. Wilks has said, should be a student till he dies—it devolves so to order your life's work that you make the best use of the improved opportunities thus provided, and to take care that the great profession to which you have aspired to belong shall, when you leave it, stand as high in the service and in the affection of the public as it does at the present time.

NOTES.

THE Select Committee of the House of Commons appointed to inquire into the administration of the museums of the Science and Art Department has presented an interim report calling attention to the peril of destruction by fire to which the collections at the South Kensington Museum are exposed. After describing the general character of the buildings and their inflammable structure, the Committee conclude their report with the following observation:—"This necessity of providing buildings suitable for the exhibition of the objects of art and science collected at South Kensington has been long under the consideration of successive Governments. Your Committee regard it as their immediate duty to lay before the House of Commons by means of an interim report their very strong opinion that permanent buildings for the adequate accommodation of the collections at the South Kensington Museum should be proceeded with without delay. They are of opinion that it will be a source of grave discredit to the country if the settlement of this matter, which has been the subject of consideration by Government for many years, and of endless correspondence between the departments concerned, is any longer delayed."

THE Paris correspondent of the *Times* reports that at Monday's sitting of the Academy of Sciences, M. Moissan communicated the results of his experiments with Prof. Dewar on the liquefaction of fluorine gas. M. Moissan announced that the gas had been liquefied at about 185° C. below zero. When a current of fluorine gas is passed into an apparatus maintained in the midst of liquid oxygen in tranquil ebullition at a temperature of − 180° C., liquefaction does not occur. But as soon as that temperature is diminished by exhausting the gas above the liquid oxygen, the liquefaction of the fluorine begins, and a clear yellow and extremely mobile liquid is obtained, which resumes the gaseous state as soon as the temperature rises. This liquid has lost the chemical activity characteristic of fluorine in a state of gas. It no longer attacks glass, silicon, sulphur, or phosphorus. Fluorine at a very low temperature, however, still attacks carburetted hydrogen, and its affinity for hydrogen seems still to exist.

JUST too late for insertion in last week's NATURE we received a cablegram from Prof. A. B. Macallum, Local Secretary for the forthcoming meeting of the British Association at Toronto, asking us to urge members of the Association to apply for Canadian Steamship berths as soon as possible, as the berths still remaining will soon be filled.

SIR ARCHIBALD GEIKIE had a hearty reception from geologists in America during his recent visit. The number of *Science* which has just reached us contains a long article, by Prof. J. F. Kemp, upon the visit of the distinguished director of our geological survey, and it is evident from the account that geologists in America regarded the occasion as one of exceptional interest. Sir Archibald Geikie crossed the Atlantic to open a new course of lectures on geology, founded in connection with the Johns Hopkins University, Baltimore, by Mrs. G. H. Williams. The purpose of the foundation is to support an annual course of lectures in geology, to be given alternately by European and American geologists of distinction; and the fact that Sir Archibald Geikie was chosen to deliver the first course is a high compliment to his learning, as well as a testimony to the breadth of his sympathies. Before he arrived in America, invitations were sent by the Johns Hopkins University to geologists throughout the country, asking them to be present, and to take part in the excursions which had been arranged. In response, fifty or more leading geologists in America accepted. While the lectures were being delivered, short excursions were conducted almost daily to places of geological interest near Baltimore, on one of which Sir Archibald Geikie and his companions were the guests of the Secretary of the Navy at the Naval Academy, Annapolis, and upon one of the United States Government vessels on a trip to view the Cretaceous and Tertiary formations along the Severn River. A longer excursion was made at the close of the lectures, so as to illustrate the geology of the State of Maryland. Through the efforts of Prof. W. B. Clark, who is also State Geologist of Maryland, the interest of the Governor of the State and of the principal railway and mining officials had been secured, so that free transportation was given on the Baltimore and Ohio, the Cumberland and Potomac, and the Western Maryland Railways, as well as on one of the State official steamboats. Before breaking up, the entire company of geologists signed and presented a short address of thanks to the Board of Commissioners of the Maryland Geological Survey and the State Geologist, for the hospitable forethought which had enabled them to spend four days in inspecting a region presenting so many interesting geological aspects. At the close of the Baltimore visit Sir Archibald Geikie went to Washington, where he delivered an address before the Geological Society, and was afterwards given a reception in the rooms of the U.S. Geological Survey. He also gave addresses to the students of Bryn Mawr College, the Philosophical Society in Philadelphia, and the Brooklyn Institute. The different institutions seemed to vie with one another in doing honour to their guest; and it is to be hoped that when an opportunity arises, the cordial feeling thus manifested will be fully reciprocated. Sir Archibald Geikie returned to London a few days ago. His lectures at the John Hopkins University will ultimately be published.

WE regret to hear that Dr. Fritz Müller, the well-known biologist, died at Blumenau on May 21.

A BILL to legalise the use of weights and measures of the metric system was given a first reading in the House of Commons on Thursday last.

AN afternoon meeting of the Anthropological Institute will be held on June 15, at the South Kensington Museum, when Mr. A. P. Maudslay will lecture on "The Maya Monuments and Inscriptions in Central America."

IT is announced that the memorial to Joseph Thomson, the African explorer, will be unveiled by Sir Clements Markham, K.C.B., F.R.S., at Thomson's native town, Thornhill, near Dumfries, on Tuesday next, June 8.

THE great lens for the Yerkes telescope has just been finished by the Clarks, at Cambridgeport, and shipped to the University of Chicago, where it will be immediately mounted, as the tube and connected apparatus are already in position.

IN reply to a question asked in the House of Commons on Friday last, whether any steps had been taken to fix the site of the new magnetic observatory at Greenwich, the First Commissioner of Works replied that a site had been selected, with the concurrence of the Astronomer Royal.

A NEW biological station at Millport, on the Clyde, was opened a few days ago (says the *British Medical Journal*) by Dr. John Murray, F.R.S. The station has been erected at a cost of 1500*l.*, and though in regard to accommodation and equipment it cannot compare with many similar institutions in this country and the continent, as Dr. Murray pointed out, its position makes it a place of very great possibilities. The collection of the late Dr. Robertson, who did so much for the station, has been presented by his wife for the museum of the building.

THE State recognition given to the International Congress of Medicine and Surgery, to be held in Moscow in August next, is referred to in the *Lancet*. The Czar has taken the Congress under his patronage, and has consented to receive deputations from the various nationalities represented at the Congress. It is probable that the reception will take place in St. Petersburg immediately after the close of the meetings in Moscow. The Russian Government has acted most liberally towards the Congress. It has increased its original grant of 50,000 roubles towards the expenses by an additional grant of 25,000. This makes the handsome total of 75,000 roubles, or about 8000*l.* at the present exchange. In addition to this, the State has promised free railway tickets to members of the Congress from the frontier to Moscow and back. To Russian members similar free tickets will be granted from any part of the empire. Just as liberal recognition has been given by the Russian Government to the International Geological Congress to be held at St. Petersburg at the end of August.

IN connection with the recent correspondence in these columns on luminous phenomena observed on mountains, it is interesting to direct attention to a very remarkable series of observations of electrical storms on Pike's Peak, Colorado, contained in vol. xxii. of the Annals of the Astronomical Observatory of Harvard College, and described in NATURE (vol. xlii. p. 595, October 16, 1890). Luminous jets appeared very often along the telegraph wires for the length of an eighth of a mile, and the anemometer cups looked like revolving balls of fire. Upon touching the anemometer under these conditions, an observer found "his hands instantly become aflame. On raising them and spreading his fingers, each of them became tipped with one or more cones of light nearly three inches in length." Many more striking effects of this character are described in detail in the report to which reference has been made.

THE Smithsonian Institution is publishing in their "Miscellaneous Collections" a number of interesting memoirs submitted in the Hodgkins Fund Prize Competition. No. 1077 of this series is a contribution by Mr. A. McAdie, on the equipment and work of an aero-physical observatory, in which he deals especially with the question of future research in connection with our knowledge of atmospheric air and the prevision of weather. After the experience of twenty-five years, the author asks, "Has the synoptic map realised the expectations of meteorologists, and justified the expense of its existence?" The answer is in the affirmative; but if the further question is asked whether the forecaster of to-day is far in advance of the forecaster of 1870, the reply is uncertain, and the experience of recent years would seem to indicate that we have nearly exhausted the capabilities of the weather map in its present form. An aero-physical laboratory would afford opportunity for important research and investigation, and the author draws attention to some profitable lines of study bearing upon the conditions which control the weather. Among such investigations, Oberbeck's papers on the "Motions of the Atmosphere," and von Bezold's "Thermodynamics of the Atmosphere" may be mentioned as examples of the lines indicated. The study of atmospheric electricity also offers possibilities of great extension of our knowledge of atmospheric phenomena. In 1752 a simple experiment demonstrated the nature of the lightning flash, but at the present time the origin of the electricity of thunder-clouds, and similar questions, are as the nature of the lightning was before the time of that experiment. Much useful scientific work in weather forecasting has undoubtedly been done, but it remains none the less true that the present condition of our knowledge is still unsatisfactory.

IN the House of Lords on Friday last, Lord Stanhope moved —"That her Majesty's Government should be invited to take such further steps as are necessary under the Finance Act, 1894–96, to preserve in the country 'such pictures, prints, books, manuscripts, works of art, and scientific collections, not yielding income, as are of national, scientific, or historic interest.'" Speaking upon the subject of the motion, Lord Kelvin pointed out its great importance so far as scientific collections were concerned. It might have an exceedingly injurious effect upon scientific investigation in this country if the heavy death duties were charged upon apparatus for scientific research or upon natural history collections, the property of private owners. Very large sums of money had been spent on private observatories. A large part of the astronomical investigation in the United Kingdom had been performed by amateur astronomers, if he might use the word, who stood at the very head of scientific men in respect of knowledge and skill in scientific investigation. A large amount of money had been spent upon private observatories, on great telescopes, and on other instruments of research, which would be subject to exceedingly heavy death duties, and the heirs of the proprietors might find it impossible to keep them. The result might be that it would be necessary to sell them; foreign purchasers might get them, and those valuable tools for scientific work might be sent out of England and leave this country so much the poorer in respect of scientific work. The same might also be said of natural history collections. Such collections were of unique value. A man might spend his whole life in the work of making such collections and leave something that was of priceless value in reality, and which would be estimated at a very high money figure if the expense involved in creating the collection was to be taken into account. It would be most disastrous that such natural history collections or apparatus for scientific investigation should be subjected to the severe death duties that were charged on those to whom was left property which they could use, and which might be sources of income and revenue to the inheritors, when that which was inherited could only be of use through the inheritor devoting himself, as the creator of the collection had devoted himself, to the public good and for the advancement of science. He thought it would be exceedingly bad, and in every way undesirable that a duty anything more than merely nominal should be charged in such cases.—Lord Cross explained that there was a great desire on the part of the Chancellor of the Exchequer to deal fairly with this matter. Anything that could be done within the terms of the Act of Parliament would be done by him to keep works of art, whether they be pictures, manuscripts, scientific collections, or scientific instruments, in the country. He hoped, therefore, that the motion, with the main object of which the Government fully sympathised, would not be pressed. The motion was afterwards negatived without a division; so the decision whether the objects referred to shall be liable for estate duty or not, remains with the Chancellor of the Exchequer.

A VERY valuable address on the progress of medicine in the Victorian Era, delivered on May 27 by Mrs. Garrett Anderson, M.D., before the East Anglian Branch of the British Medical Association (of which branch she has been elected President), concluded with the following clear statement of the directions in which advances may be gained by research. "It is in medicine proper that more light is specially needed. We want, in medicine, more of the knowledge that can only be gained through research. We want to know the real nature of malignant growths, the complete life-history of the bacillus of diphtheria, of the parasite of malaria, the conditions they require, and how to produce immunity from them and from tuberculosis. It does not need much imagination to realise how the world would be helped, and its sorrows lightened, if cancer, consumption, and diphtheria could be brought under control in at all the same measure as small-pox, thanks to Jenner, has been brought; nor how civilisation would advance by leaps and bounds in many parts of the world if malaria could be effectually combated. Victory in these directions can only come through patient and laborious research, and we should all do our best so to educate public opinion that the true value of this work should be generally recognised, and that the demand for it should no longer be restricted within the narrow limit of the world of science."

PROF. KOCH's final reports upon his rinderpest investigations at Kimberley, appear in the Cape Town *Agricultural Journal* of April 1. The following extracts from the last report, dated March 22, are of interest:—"I consider my researches, respecting the rinderpest, finished in the main, and I believe that I can leave the further working out of them to Dr. Turner, who will for some time still have the assistance of Dr. Kohlstock, and later that of Dr. Kolle, should it be possible to arrange this. This ensures the continuity between my work hitherto and the further investigations at the experimental station. What I had been able so far to find out regarding the microbe of the rinderpest seemed to me too uncertain to mention in my reports. But I have shown Dr. Turner everything I have found in this respect, and he will try to gain further facts about the occurrence and habits of these microbes which, at any rate, do not belong to the class of Bacteria. The discovery that by injection of gall taken from rinderpest animals, sound animals may be protected against rinderpest, and that this discovery is also practically applicable, I consider absolutely proved in view of the results achieved on the farm 'Susanna.' Should my hopes respecting the artificial production of rinderpest-gall by mixture of gall and rinderpest-blood, about which I am not quite certain at present, not realise themselves, it will still be possible to obtain any desired quantity of effective gall by infecting a proportional number of cattle with rinderpest blood and killing them on the sixth or seventh day of the illness. The use of gall for immunisation seems at present to me to be so far superior to immunising with serum, that I would advise the latter procedure to be applied only experimentally."

PROF. J. A. HARPER's paper "On Nuclear Division and Free Cell-formation in the Ascus," reprinted from Pringsheim's *Jahrbücher*, completes a valuable series of observations on the obscure process of nuclear fusion which takes place immediately before the formation of the spores in many of the Ascomycetes. The author does not take the view of several French observers, that this fusion of nuclei is of a sexual character.

THE *Bulletin of Miscellaneous Information*, issued by the Superintendent of the Botanic Garden, Trinidad, mentions the very interesting circumstance that in that island a species of *Bauhinia* (*B. magalandra*, n. sp.), belonging to the Leguminosæ, is pollinated by the agency of bats, the first instance recorded of a "mammalophilous" flower. On visiting a flower the bat alights upon and holds fast to the protruded stamens, and attacks the erect and curved petals. The object of the visit of the bats appears to be not any nectar secreted by the flower, but the insects which are attracted to it by its odour. The flowers open only in the evening.

TOWARDS the end of the notice of vol. ii. of the Cambridge Natural History, in our issue of April 29 (vol. lv. p. 610), reference was made to the admirable illustrations, and regret was expressed that the name of the artist did not appear to be given. We are glad to be able to say that the artist was Mr. Edwin Wilson, of Cambridge, whose illustrative work has taken a high place in science for some years. The volume lately reviewed was written by several different contributors, and, as there was no preface, the editors were unable to say how very much it owed to Mr. Wilson's skill and care.

TO the list of cave animals which appears in Dr. A. S. Packard's monograph in the "Cave Fauna of North America" must now be added seven forms which are new to science, and several forms which, while known, have not hitherto been definitely reported from Mammoth Cave, Kentucky. This new material is described by Dr. Ellsworth Call in the *American Naturalist* (May). The specimens described are very minute, and this fact is in itself sufficient to explain their late appearance in lists of the cave fauna. The paper is a noteworthy contribution to a knowledge of the life of the most interesting cave on the American Continent.

A REPRINT from the *Transactions* of the New York Academy of Sciences gives an account of the results obtained by an expedition to Puget Sound, organised by the Department of Zoology of Columbia University in the summer of 1895. The party consisted of six members, under the leadership of Dr. Bashford Dean. Their main object was to obtain materials for the study of the development of the Chimeroid fish *Hydrolagus*, and eggs and young of the Myxinoid form *Bdellostoma*, both known to be abundant there. In both these respects success was achieved, and large collections of other groups of marine animals were secured for future study.

AMONG noteworthy articles which have come under our notice during the past few days are the following:—Dr. R. W. Shufeldt points out, in the *Photogram* (June), that many of the figures throughout zoological literature are very frequently anything but correct, depicting often the subject in impossible attitudes, badly proportioned, and with erroneous portrayal of characters. To assist in the improvement of this state of things, he describes how photography should be called in with the view to secure pictures of living animals for reproduction by photographic processes.—The *Century Magazine* for May contains three well-illustrated articles on the construction and use of kites for meteorological and photograph purposes. In the June number of the same magazine, Mabel L. Todd describes the establishment and work of the Harvard College Observatory.—An address on "The Problems of Astronomy," delivered by Prof. Simon Newcomb at the dedication of the Flower Observatory, University of Pennsylvania, is printed in *Science* of May 21.

SOME further details, of great interest as to the fermentation of sugar in the absence of yeast-cells (see NATURE, March 11, p. 442), are given in the current number of the *Berichte* by Buchner. The active extract of yeast very rapidly loses its power of producing fermentation, owing probably to the presence of peptic enzymes. The activity of the solution is not affected by the presence of antiseptic substances, and the solid residue left on evaporation at a low temperature is found to yield an active solution, even after having been kept for nearly three weeks. These facts seem to definitely prove that the fermentation in these cases is not brought about by living protoplasm in any form, but is really due to the substance which the author has termed zymase. This is further confirmed by the fact that dried yeast which has been heated at 100° for six hours, and is incapable of further development, still yields an active solution when treated with sterilised 37 per cent. sugar solution.

THE additions to the Zoological Society's Gardens during the past week include a Chimpanzee (young) (*Anthropopithecus troglodytes*, ♀) from West Africa, presented by the Hon. Sir W. Grantham; a West African Sheep (*Ovis aries*, var. ♂) from West Africa, presented by H.E. Colonel F. Cardew, C.M.G.; a Broad-snouted Cayman (*Caiman latirostris*) from South America, presented by Mr. C. L. Hutchings; an Olive-brown Snake (*Phrynonax fasciatus*) from Trinidad, presented by Mr. R. R. Mole; a Pleasant Antelope (*Tragelaphus gratus*, ♂), four Royal Pythons (*Python regius*) from West Africa, thirteen Cunningham's Skinks (*Egernia cunninghami*), two Punctulated Tree Snakes (*Dendrophis punctulatus*) from Australia, deposited; an Alpaca (*Lama pacos*, ♂) from Peru; two Red-topped Amazons (*Chrysotis rhodocorytha*), three White-eared Conures (*Pyrrhura leucotis*) from Brazil, purchased; two Japanese Deer (*Cervus sika*, ♂ ♂), a Red Deer (*Cervus elaphus*, ♀), a Burrhel Sheep (*Ovis burrhel*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE ROTATION PERIOD OF JUPITER'S SATELLITE III.—Mr. Douglass has quite recently determined the period of rotation of Ganymede, Jupiter's third satellite, the period being given as 7 days, 5 hours (Kiel Telegram). This satellite is the brightest and largest of them all, and its sidereal revolution is 7 d. 3 h. 43 m., so that the period of rotation is practically the same as the time of its orbital revolution. This observation partly corroborates what Herschel concluded in 1797, namely, that, like our moon, all the satellites of Jupiter turn the same face towards their primary, thus always presenting to us, when in the same relative situations, the same obscure or brilliant sections of their globes. Engelmann's researches in 1871, and C. E. Burton's, two years later, made this statement of Herschel's almost certain regarding the outer satellite, and since that time it has always seemed probable that it would also apply to the other three. This new observation of Mr. Douglass shows that the deductions of the earlier observers were not very far from the truth.

Referring to this satellite in 1893, Prof. W. H. Pickering (*Astronomy and Astrophysics*, vol. xii. p. 199) said: "On account of its size and brightness, this is much the easiest satellite to observe. Indeed, even the occasionally elliptical shape of its disc has been noted by Lassell, Secchi and Burton. . . . Like our moon, therefore, its period of rotation coincides, at least approximately, with that of its revolution in its orbit. . . . Its surface markings are readily seen, especially during transit, the most conspicuous being a dark belt situated in the northern hemisphere, and inclined about fifteen degrees to its orbit."

AUTOMATIC PHOTOGRAPHY OF THE CORONA.—The idea of connecting several different kinds of instruments with some sort of central automatic arrangement by which one man may work them all during a total eclipse of the sun, is not new; but weather conditions have up to the present prevented any trial being made at the time of an actual eclipse. Mr. David P. Todd, who for the past few years has given considerable attention to this question, describes in the current number of the *Astrophysical Journal* (No. 5, vol. v.) the special automatic shutter and electric commutator which was devised for the Amherst Eclipse Expedition of last year, but which was, unfortunately, not used owing to the bad weather. In all twenty photographic instruments would have been worked by an automatic system, which would have given more than four hundred exposures with several types of reflecting and refracting telescopes, photographic doublets, a pair of spectroscopes, photometers, and a pair of polariscopes.

The system which Mr. Todd advocates is an electric system of control, and he has found that it is perfectly competent to operate any available number of eclipse instruments adapted for photographic purposes; it further makes the time record of every automatic movement in a form which can be identified.

It would be difficult to give the reader a clear idea of this arrangement without the medium of an illustration; so that we refer him to Mr. Todd's article for detailed information.

THE GEGENSCHEIN OR ZODIACAL COUNTERGLOW.—In some former numbers of the *Astronomical Journal* (*A. J.*, vii. 186, xi. 19, and xiii. 169), Prof. Barnard contributed his observations of this phenomenon as seen at the Lick Observatory. His communication to a more recent number (No. 403) of the same journal contains some further observations of considerable interest made at the Yerkes Observatory. He